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PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

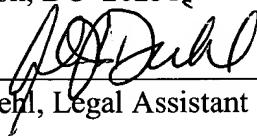
Applicant: Hiroshi Suzuki)
)
S.N.: 09/331,829) Examiner: R. Sellers
)
Filed: June 23, 1999) Art Unit: 1712
)
For:)
_____)

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Alison Diehl, Legal Assistant

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RESPONSE AND AMENDMENT D

Dear Sir:

The Office Action Summary, mailed December 5, 2002, having a shortened statutory period for response set to expire January 5, 2003, requires restriction to one of the following alleged patentably distinct inventions under 35 U.S.C. §121:

I. Claim(s) 11, 12 and 17, drawn to a composition comprising an epoxy resin, curing agent and a tetrakisphenol, classified in class 528, subclass 88;

II. Claim(s) 13 and 14, drawn to a method for curing an epoxy resin comprising mixing a curing agent, a tetrakisphenol and an epoxy resin, classified in class 525, subclass 523;

III. Claim(s) 15 and 16, drawn to a curative for an epoxy resin comprising a tetrakisphenol clathrate and an epoxy group-reactive compound, classified in class 428, subclass 402.2;

IV. Claim(s) 18 and 19, drawn to a composition comprising an epoxy resin, a tetrakisphenol clathrate with an epoxy group-reactive compound, and a tetrakisphenol clathrate with a curing accelerator, classified in class 523, subclass 205;

V. Claim(s) 20 and 22, drawn to a method for curing an epoxy resin comprising mixing a tetrakisphenol clathrate and an epoxy group-reactive compound with an epoxy resin and heating to a predetermined temperature, classified in class 525, subclass 523; and

VI. Claim(s) 21 and 22, drawn to a method for curing an epoxy resin comprising mixing tetrakisphenol clathrate and an epoxy group-reactive compound, and a tetrakisphenol clathrate and a curing accelerator with an epoxy resin and heating to a predetermined temperature, classified in class 525, subclass 486.

The Examiner requires restriction to one of the following alleged patentably distinct species of the claimed invention under 35 U.S.C. §121:

1. Contingent upon election of Group I, II, or V:

a. The epoxy resins such as the UVR-6410 which is a bisphenol A diglycidyl ether according to Chemical abstracts registry no. 25085-99-8.

b. The curing agents or epoxy group-reactive compounds such as the selection of one among those listed on page 22 of the specification.

c. The tetrakisphenols such as those listed on page 23.

2. Contingent upon the election of Group III:

a. The curing agents or epoxy group-reactive compounds such as the selection of one among those listed on page 22 of the specification.

b. The tetrakisphenols such as those listed on page 23.

3. Contingent upon the election of Groups IV or VI:

- a. The epoxy resins such as the UVR-6410 which is a bisphenol A diglycidyl ether according to Chemical abstracts registry no. 25085-99-8.
- b. The curing agents or epoxy group-reactive compounds such as the selection of one among those listed on page 22 of the specification.
- c. The tetrakisphenols such as those listed on page 23.
- d. The curing accelerators such as the selection of one among those listed on page 22.

ApplicantS traverse the requirement for the reasons stated hereinafter and respectfully request withdrawal of the restriction requirement. Nevertheless, in accordance with the election requirement, Applicant elects Group I (Claims 11, 12 and 17).

As for the election of species, Applicants elect bisphenol, a diglycidyl ether as an epoxy resin, 1B2MZ (1-Benzyl-2-methylimidazole) as a curing agent, and TEP (1,1,2,2-Tetrakis(4-hydroxyphenyl)ethane as a tetrakisphenol.

In the following, Applicants would like to respond to the comments made in the Office Action dated September 5, 2002.

1. In the Office Action (the former portion of the third paragraph of page 7), the Examiner states:

"Some potential problems not conforming to 35 U.S.C. 112, first and second paragraphs, have been discovered regarding new claims 11-22. There is no support on page 6, the last two paragraphs and page 7, lines 6-7 for the curative agent being characterized as "non-clathrated" in claims 11 and 13."

That is, in the Office Action, the Examiner points out that in the specification of the present invention, there is no support for a curing agent characterized as "non-clathrated" i.e., not forming a clathrate.

As pointed out by the Examiner, there is no direct statements as to a curing agent characterized as "non-clathrated". However, the scope of "curative agent" or curing agent for an epoxy resin composition appearing in the citation by the Examiner and cited below (general formula [I] omitted) was not intended to be limited in any way depending on whether the "curative agent" or curing agent is incorporated in a clathrate or not.

"the present invention is also directed to an epoxy resin composition characterized by containing a curative which reacts with the epoxy group of an epoxy resin to cure the resin and a tetrakisphenol compound represented by a general formula [I];"

"wherein X represents $(CH_2)_n$, wherein n is 0, 1, 2 or 3, R^1 to R^8 each represents hydrogen, a lower alkyl, optionally-substituted phenol, halogeno or a lower alkoxy, in an amount of from 0.001 to 0.1 mole based on 1 mole of epoxy groups."

(from the last paragraph of page 6 to the first paragraph of page 7, general formula [I] omitted)

The intention that there was no such limitation is obvious by the contrast between the portion cited above and the one cited below, the latter of which clearly describes that an epoxy resin composition contains a clathrate comprising a curing agent (a curative) and a tetrakisphenol.

"the present invention is directed to a curative for epoxy resins, characterized that the curative is composed of a clathrate of a tetrakisphenol compound represented by a general formula [I];"

"wherein X represents $(CH_2)_n$, wherein n is 0, 1, 2 or 3, and R^1 to R^8 each represents hydrogen, a lower alkyl, optionally-substituted phenyl, halogeno or a lower alkoxy, and a compound which reacts with the epoxy group of an epoxy resin to cure the resin, and to a curing accelerator, characterized by being a clathrate comprising a tetrakisphenol compound represented by the general formula [I] shown above and a compound accelerating the curing of a compound which reacts with the epoxy group of an epoxy resin to cure the resin."

(from the last paragraph of page 5 to the first paragraph of page 6)

Therefore, although the citation by the Examiner does not directly describe "non-clathrated compound", it can naturally be construed as curing agents in general, including the "non-clathrated" curing agent. This point is obvious from the fact that there is a portion clearly describing clathrated curing agents.

In the first place, the reason why "non-clathrated" is used in the amendments filed when the Request for Continued Examination (RCE) was filed on October 23, 2002 was to clearly show the Examiner that Tetrakisphenols (TEPs) itself have catalytic activities in curing epoxy resins even in a situation where curing agents are not clathrated. Therefore, if the Examiner suggests that the rejection can be overcome if the phrase is deleted from the claims, we may think about a possibility of deleting the phrase.

2. In the Office Action (the latter portion of the third paragraph of page 7), it is also stated that:

"the phrase "curative agent" should be amended to the more art-recognized "curing agent."

Regarding this point, following the Examiner's suggestion, we would like to amend "curative agent" to "curing agent", which is more recognized in the art.

3. In the Office Action (the last paragraph of page 7), the Examiner states that:

"There is no support for the tetrakisphenol by itself designated as a curing accelerator catalyst of claims 11 and 13 on page 6, lines 14-17 as described in the amendment filed September 21, 2001 (Paper No. 16, page 11) since the combination of the tetrakisphenol and curing accelerator functions to accelerate the curing of the epoxy resin."

Regarding this point, we pointed out in the amendment filed when RCE was requested (Paper No. 28), that there are descriptions in the specification about the fact that tetrakisphenol itself has catalytic activities as accelerators of curing epoxy resins. Following is a citation of the relevant part from the response filed when requesting the RCE.

"The catalytic action of TEP in accelerating the curing is supported from the descriptions in the specification of the present invention.

(1) "the inventors of the present invention found that the tetrakisphenol compound itself has an excellent catalytic action for curing epoxy resins."

(p. 14 line.6 from the bottom of the English specification).

This description indicates that TEP has a catalytic property of curing epoxy resin by itself, that is, TEP has a property of accelerating the curing by itself.

(2) "((~) and are curable by just heating them up to a certain temperature) to **promptly produce a cured-product. The curing of the epoxy resin should not be initiated at a temperature below 80 °C or around. However, the epoxy resin starts curing rapidly when temperature raised to a range of from 100 to 130 °C, which is normally desired for curing.**" (page 14, lines 7 to 12 of the English specification).

This description shows a catalytic action of TEP itself, a host compound of a clathrate, in accelerating the curing and explains the action of TEP itself that has just lost its guest by having released a curative, a guest compound, from a clathrate, wherein a TEP is a host compound, and further explains that a curative, a guest, is released from a clathrate when heating the clathrate comprising a curative as a guest compound and a TEP as a host compound to a certain temperature (around 100 to 130 °C), therefore free TEPs (hosts having no guests) and non-clathrated curatives are present in the reaction system, and the free TEPs accelerates the curing of an epoxy resin by non-clathrated curatives, and "**promptly produce a cured-product**" and as a result, "**starts curing rapidly.**"

(3) "By using the epoxy resin composition according to the present invention containing a tetrakisphenol compound, various curing reactions can proceed faster and smoothly even under a mild condition, which allow to obtain stable cured products, because of the excellent catalytic activity of a tetrakisphenol compound for curing epoxy

resins, and the curing property of a resin composition can be extremely improved by using the inventive epoxy resin composition when compared to the curing by using a curative only." (page 15, lines 8 to 15 of the English specification).

The description cited above clearly indicates that TEP itself has a catalytic property of the curing of an epoxy resin, that is, TEP itself has a property of accelerating the curing. It is also mentioned that the curing reactions can proceed faster and smoothly even under a mild condition due to the free TEPs, compared with a curing reaction using curatives alone.

(4) Examples 21 and comparison example 20 of the specification demonstrate that a TEP acts as a catalyst in the reaction system of curing epoxy resin (see also Table 19).

More concretely, in example 21, while the pot life of a epoxy resin composition to which non-clathrated curatives 1B2MZ and the free TEPs are added is only one hour or so (12500 → 23500; 1h in the leftmost column of Table 19: "the viscosity of resin (CP/25°C))" by the catalytic action of a TEP itself in the curing of an epoxy resin, the pot life of a resin when only a non-clathrated curatives 1B2MZ is used is about 10 hours (10200 → 20400; 10h in the fourth column from the leftmost of Table 19: "the viscosity of resin (CP/25°C)"). In the specification of the present application, the pot life of a epoxy resin refers to the time before the initial viscosity of a resin (cp/25°C) doubles. As shown above, the fact the pot life will be 1/10 when free TEPs are added to non-clathrated curatives 1B2MZ means that and it is experimentally demonstrated that the free TEP itself has a catalytic action in the curing of epoxy resins.

Such a property of accelerating the curing of an epoxy resin composition that a TEP itself has is a characteristic of TEP, and cannot be found in other host compounds. The contrast is shown in Table 19 as well. For comparison, the results of the experiment using a host (phenol) described in the prior art references together with non-clathrated curatives 1B2MZ are given in the rightmost column of Table 19: "Viscosity of Resin (CP/25°C)", the pot life when free phenol is replaced with TEP is 8 hours (9000 → 18400), and there is little difference compared with the pot life of using a non-clathrated curative 1B2MZ alone (10 hours).

In the experiment of the example 21, the changes of viscosity with time were measured by adding 1B2MZ and TEP to the base resin UVR-6410, mixing at 25°C for 10 minutes, and further leaving it at 25°C for 20 minutes. Considering the conditions where experiments were carried such as: adding 1B2MZ and TEP to UVR-6410 without producing clathrates comprising 1B2MZ and TEP, and carrying out the experiments at as a low temperature condition as 25°C where clathrate compounds cannot be formed with 1B2MZ as a guest and TEP as a host due to the low temperature, and 1B2MZ, a guest, cannot be released from a clathrate compound comprising 1B2MZ as a guest and TEP as a host, there is no other way to account for the experimental result by concluding that it is a common knowledge for the one in the art that 1B2MZ, a non-clathrated curative, and free TEP contribute to the curative reaction in the experiments in example 21. In other words, it would be unacceptable to consider that clathrate compounds were produced with TEP as a host and thereby accelerated the curing reaction of epoxy resins."

From the above citation, the Examiner's statement that "[t]here is no support for the tetrakisphenol by itself designated as a curing accelerator catalyst of claims 11 and 13 on page 6, lines 14-17 as described in the amendment filed September 21, 2001 (Paper No. 16, page 11) since the combination of the tetrakisphenol and curing accelerator functions to accelerate the curing of the epoxy resin." is not correct.

4. In the Office Action (the first paragraph of page 8), it is stated that:

"The reiteration of formula (I) in dependent claims 12, 14, 19 and 22 is redundant since independent claims 11, 13, 17 or 18, and 20 or 21 already defines the structure."

As pointed out by the Examiner, since independent claims 11, 13, 17, 18, 20 and 21 already define the structure (I), there is no need to define the structures (I) described in claims 12, 14, 19 and 22. Therefore, we would like to make amendments to delete the structure (I) from claims 12, 14, 19 and 22, together with the explanation to the structure. We would like to keep the structure (I) as they are in independent claims 11, 13, 17, 18, 20 and 21. Claims 15 and 16, which are not mentioned in the above citation from the Office Action, are independent claims, and therefore the structures in (I) will be kept as they are.

5. In the Office Action (the third paragraph of page 8), it is stated as follows:

"Page 10, lines 18-19 concisely identifies R^1 to R^8 of formula (I) as the substitution of the phenyl group with halogen or a C_1 - C_6 alkyl, or halogeno or a C_1 - C_6 lower alkoxy. Pages 6 and 7, line 3 as well as claims 11-22 define R^1 to R^8 as an "optionally-substituted phenyl, halogeno or a lower alkoxy." This species of R^1 to R^8 would be more clearly enabled and more concisely denoted as "a phenyl optionally substituted with halogen or C_1 - C_6 alkyl, a halogen or a C_1 - C_6 alkoxy."

The explanation to the structure [I] of claims 11-22 are stated as follows (underline added):

"wherein X represents $(CH_2)_n$, wherein n is 0, 1, 2 or 3, and R^1 to R^8 each represents hydrogen, a lower alkyl, optionally-substituted phenyl, halogeno or a lower alkoxy,"

In order to make the species of R^1 to R^8 more clearly and concisely, we would like to amend the corresponding part in claims 11, 13, 15, 16, 17, 18, 20, 21 as follows:

"wherein X represents $(CH_2)_n$, wherein n is 0, 1, 2 or 3, and R^1 to R^8 each represents hydrogen, a lower alkyl, a phenyl optionally substituted with halogen or C_1 - C_6 alkyl, a halogen or a C_1 - C_6 alkoxy,"

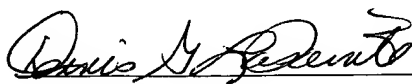
Clearly, there is a very close relationship between the alleged different inventions. As the Examiner is aware, Section 121 requires the Examiner to find that the inventions be independent and distinct. Also see, Torok v. Watson, Com'r Pats., 122 F. Supp. 788, 103 U.S.P.Q. 78 (DC 1954).

In addition, the statutory basis of restriction practice under Section 121, provides that if two or more independent and distinct inventions are claimed in one patent application, the Examiner may require the application be restricted to one invention. This authority is discretionary, not mandatory. Accordingly, Applicants respectfully request that such discretionary authority not be invoked and the restriction requirement be withdrawn.

Applicants also elect with the understanding that should future divisional applications be filed to prosecute the non-elected species and any remaining claims, Applicants will not be presented with a double-patenting rejection for the claims readable on the non-elected species.

Applicants respectfully request that the amendment of claims attached to this response be entered prior to examination of the specific claims and species elected. Please cancel currently pending claims 11-22 without prejudice, and substitute with new claims 23-34. The corresponding elected group I claims are now 23, 24 and 29.

Very respectfully,



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Dated: 12/27/02

12-30-02

1712

Practitioner's Docket No. 1576.77

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re application of: Hiroshi SUZUKI, Izuo AOKI and Satoru ABE

Application No.: 09/331,829

Group No.: 1712

Filed: 06/23/1999

Examiner: R.E. SELLERS

For: CURATIVES FOR EPOXY RESIN, CURING ACCELERATOR, AND EPOXY RESIN COMPOSITION

Box Non-Fee Amendment
Commissioner for Patents
Washington, D.C. 20231

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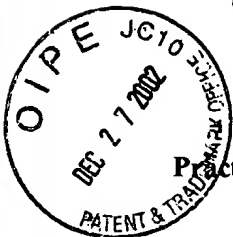
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Alison Diehl, Legal Assistant



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Practitioner's Docket No. 1576.77

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Hiroshi SUZUKI, Izuo AOKI and Satoru ABE

Application No.: 09/331,829

Group No.: 1712

Filed: 06/23/1999

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AMENDMENT TRANSMITTAL

1. Transmitted herewith is an amendment for this application.

STATUS

2. Applicant is other than a small entity.

EXTENSION OF TERM

3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply. Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*

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Signature

Date: December 27, 2002

Alison Diehl, Legal Assistant

(type or print name of person certifying)

* Only the date of filing (' 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under ' 1.8 continues to be taken into account in determining timeliness. See ' 1.703(f). Consider "Express Mail Post Office to Addressee" (' 1.10) or facsimile transmission (' 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

FEE FOR CLAIMS


4. The fee for claims (37 C.F.R. 1.16(b)-(d)) has been calculated as shown below:

	(Col. 1)	(Col. 2)	(Col. 3)	OTHER THAN A SMALL ENTITY			
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDIT. FEE		
TOTAL	12	-	20 =	0 x \$ 18.00	= \$	0.00	
INDEP.	8	-	8 =	0 x \$ 84.00	= \$	0.00	
FIRST PRESENTATION OF MULTIPLE DEP. CLAIM				+ \$ 0.00	= \$	0.00	
				TOTAL ADDIT. FEE	\$	0.00	

No additional fee for claims is required.

Date: 12/27/02

Reg. No.: 40,693
Tel. No.: 727-538-3800
Customer No.: 24040



Signature of Practitioner
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